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## LOCAL ACCOUNT MANAGER FOR A MEDIA DELIVERY NETWORK

### 10 FIELD OF THE INVENTION

The present invention generally relates to a media delivery service system. More particularly, the present invention relates to enabling localized customer account management within a media delivery service system.

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### BACKGROUND OF INVENTION

More than ever before, residential consumers are being provided with a wealth of media resources. While cable television, the Internet, and on-demand media have been available for years, recently  
20 developed high-speed broadband technologies are enhancing the delivery of these media services. These technologies have made it possible to increase the variety of available media services and to enhance the ability of the user to interact with the media delivery system to tailor media delivery to the user's preferences. Satellite communications, asymmetric digital subscriber  
25 lines (ADSL), and broadband cable are providing new high-throughput

connections to media delivery services. Media services consumers are commonly establishing wireless connections to satellites, telephony-based connections to ADSL, and broadband cable connections to the media service providers. Typically, these connections are processed by a Media  
5 Distribution Device (MDD) that processes media content and data and routes the media and/or data to media presentation devices, such as a television or personal computer. A conventional Set-Top Box is an example of a MDD.

It has become commonplace for media delivery service  
10 providers to provide an access point through which a customer can tailor the customer's account to the customer's preference. For example, such an access point might permit the customer to choose between various predefined media delivery packages. The access point also may be used to enable the customer to create its own media package by picking and  
15 choosing from available media content. The access point also may permit a customer to select media content on a "pay-per-view" basis.

A customer account access point can also be used to provide the customer with various billing options. For example, the user may be able to view a current bill, verify the bill's accuracy, and pay the current bill through  
20 a predefined debit process. The customer account access point may also allow the customer to determine the effects of an account modification on future bills by generating a simulated bill reflecting the additional media delivery services requested.

Various approaches have been implemented to provide such  
25 customer account access points. The first such approach permitted a

customer to contact an operator by telephone. The customer could request that the operator provide account information and/or make modifications to the customer's account. The operator would check a customer account database to verify the caller's identity and, if authorized, would provide the requested information or modify the customer's account. Alternatively, the operator might provide an authorization number that the customer could enter into a MDD, such as a conventional Set-Top Box to modify the media services provided to the MDD.

Another approach for providing a customer account access point implemented an automated system such as a telephony-based Interactive Voice Response (IVR) system that automated the access and authorization functionality. Yet another approach was developed following the advent of two-way communication between the media delivery service provider and the MDD (e.g. an ADSL communication link). In this approach, the MDD would have a built-in user interface that would permit the customer to access a centralized customer account database. Once the customer had obtained access to the centralized customer account database, the customer could obtain account information and/or modify the customer's account.

Unfortunately, all of these approaches suffer from the same shortcoming. All of these approaches require that a centralized customer database be continuously updated and accessible. This maintenance and accessibility can be expensive, because comprehensive records must be kept and updated for every customer of the media delivery service provider. In addition, communication between the customer's MDD and the centralized

customer database is demanding of network resources. Providing customers with continuous access under the approaches listed above can congest communication between the media delivery service provider and all other customers on the network.

5                   Therefore, there is a need in the art for a localized account management tool that enables a customer to modify an account locally, without requiring real-time interaction with a centralized customer account database. The account modifications made with the localized account management tool should be instantaneously effective. The localized account  
10 management tool also should provide access to updated customer billing records.

#### SUMMARY OF THE INVENTION

15                   A media delivery service provider has a customer account management center associated with it. The customer account management center has a customer account database for maintaining account information and billing information for all subscribers to the Media Delivery Service Provider. The customer account management center is operative to communicate with a local account manager in a Media Distribution Device  
20 (MDD) over a broadband connection. Because a broadband connection can maintain an always-on status, the local account manager can autonomously send local account data to the customer account management center during off-peak hours of operation, thereby reducing the impact on system resources. Any changes made by the customer to local account data can be  
25 immediately effective to modify the media delivered to the MDD. The local

account data can be later packaged and transmitted by the local manager to the customer account management center.

The customer account management center can examine the received local account data and update the customer account database to reflect the customer's desired account modifications. The transmission of local account data to the customer account management center can be done during off-peak hours or at any time. The customer account management center can query the MDD to initiate such a transmission at any time. The high-speed communication provided by an ADSL connection enables real-time modification of the customer account database, should such a modification be desired. Moreover, a broadband connection between the MDD and the media delivery service provider enables the transmission of very large amount of media content. As described above, the local account manager can be used to filter the media content on a per-customer basis. Thus, a customer can receive instantaneous delivery of media content, without requiring interaction with the customer account management center.

The various aspects of the present invention may be more clearly understood and appreciated from a review of the following detailed description of the disclosed embodiments and by reference to the drawings and claims.

#### BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a block diagram of an exemplary operating environment in which embodiments of the present invention may be implemented.

Figure 2 is a block diagram depicting some of the primary components of an exemplary Media Distribution Device.

Figure 3 is a block diagram depicting a Media Delivery Account Management System that is an exemplary embodiment of the present invention.

Figure 4 is a flow chart depicting an exemplary method for locally modifying a media delivery services account.

## DETAILED DESCRIPTION

Figure 1 is a block diagram of an exemplary operating environment in which embodiments of the present invention may be implemented. Media is typically delivered to a customer by means of a Media Distribution Device **100**. The most common Media Distribution Devices are conventional Set-Top Boxes (STBs). The Media Distribution Device (MDD) **100** can provide media content and/or data to a media presentation device **101** over communication link **102**. The most common example of a media presentation device **101** is a conventional television. Typically, the MDD **100** will deliver only media content to media presentation device **101**. However, more recently developed media presentation devices **101** also have the ability to process data received from the MDD **100**. Such data may include information pertaining to the presentation of the media content on the media presentation device **101**.

Another example of a media presentation device **101** is a conventional personal computer. The personal computer can receive media content, such as Internet content from the Media Distribution Device and

present it to a customer/user. As is well known, a personal computer can also process data received from the Media Distribution Device **100** to format the presentation of the delivered media content.

The MDD **100** can receive media content and data from one or  
5 more sources. In the example of Figure 1, the MDD **100** is depicted receiving media and data from a media delivery service provider **103**. Examples of media delivery service providers **103** include a cable T.V. provider, a satellite T.V. provider, an Internet service provider, and a telephone service provider. Notably, the media content and data may be  
10 delivered over a single communication link or may be delivered over separate communication links.

In the example of Figure 1, the media delivery service provider **103** can provide media content and data to the MDD **100** via an Asymmetric Digital Subscriber Line (ADSL) modem **106**. The media delivery service  
15 provider **103** may also provide media content and data to the MDD **100** via a satellite **104**. The satellite can deliver media content and data directly to the MDD **100** over communications link **122**. Such a direct link usually involves the use of a small satellite dish in conjunction with the MDD **100**. The satellite **104** can also deliver the media content and data to the media  
20 delivery service provider **103** via communication link **120** from, for example, another media distribution service. This media content and data may be rerouted to the MDD **100** from the media delivery service provider **103** over a separate communication link.

The MDD **100** may also have a direct communication link **108**  
25 with the media delivery service provider **103**. Such a link might be a

conventional 2400 baud modem connection to the media delivery service provider **103**. This communication link **108** may also be a direct hardwire connection or a network connection, such as an Ethernet connection.

In any event, the MDD **100** receives media content and data  
5 from a media delivery service provider **103** and delivers the media content and/or data to the media presentation device **101** for presentation to the customer. Typically, the MDD **100** can communicate in two-directions over communication links **108** and **124**. That is, the MDD **100** can respond to queries and/or commands received from the media delivery service provider  
10 and return data and/or messages, in response to the receipt of a query or command. The Simple Network Management Protocol (SNMP) is a standard that has been developed to standardize such two-way communication between the MDD **100** and the media delivery service provider **103**. Typically, an SNMP agent will be installed in the MDD**100**  
15 and will coordinate all SNMP communications between the MDD**100** and the media delivery service provider **103**. Notably, such two-way communications are not typically available over communications link**122** with the satellite **104**.

When a customer associated with the media presentation device  
20 **101** wishes to modify his media delivery customer account or wishes to obtain billing information, the customer will typically contact the media delivery service provider **103** by telephone, via a website, or by means of a user interface integrated into the media presentation device**101** and/or the MDD **100**. The conventional media delivery system requires two-way  
25 communication between the MDD **100** and the media delivery service



provider **103**. The customer can access and modify the customer's account in real-time. Thereafter, the media delivery service provider **103** will modify the media delivery to the customer, in accordance with the customer's account modification. For example, the media delivery service provider may configure the signal to the customer's MDD **100** to exclude (i.e., disable presentation of) a cable T.V. channel that the customer was previously receiving. The media delivery service provider **103** will modify a customer account database to reflect the changes made by the customer.

In an exemplary embodiment of the present invention, the customer can modify its customer account locally, without initiating two-way communication with the media delivery service provider **103**. While the media delivery service provider **103** can still maintain a customer account database, the customer account modifications need not be immediately transmitted to the media delivery service provider. Subsequently, preferably at an off-peak time, the customer's modifications to its customer account can be transmitted to the media delivery service provider **103** for modification of the customer account database. Thus, the media delivery service provider's network is not burdened by customer account transactions during peak hours of operation.

Figure 2 is a block diagram depicting some of the primary components of an exemplary Media Distribution Device. The conventional Media Distribution Device **200** includes a processing unit **221**, a system memory **222**, and a system bus **223** that couples the system memory to the processing unit. The system memory **222** includes read-only memory (ROM) **224** and random access memory (RAM) **225**. A basic input/output

system **226** (BIOS) contains rudimentary code to execute basic functions, such as system start-up. The BIOS **226** is stored in the ROM **224**. Various other program modules may be stored in the RAM **225**. Such program modules might include an operating system **235**, a local account manager **236** and local account data module **238**.

Although not depicted in Figure 2, the MDD **200** could also include a hard drive or other non-volatile memory for long-term storage of program modules such as the operating system **235**, the local account manager **236**, and the local account data module **238**. The hard drive may be connected to the MDD via a hard drive interface (not shown). Similarly, other peripheral devices could be connected to the MDD with other interfaces not depicted in Figure 2. The MDD also could be equipped with an input device, such as a keyboard and/or mouse.

The MDD **200** also can include a video adapter **248** or other adapter for delivery of media content and/or data to a media presentation device **247**. The MDD **200** also can include a Media In Adapter **246** and a Data In Adapter **253**. These adapters permit connection of the MDD **200** to a communication link for one-way and/or two-way communication with a media delivery service provider. The Media In Adapter **246** and the Data In Adapter **253** may incorporate a modem and/or other communication device.

The MDD **200** can receive media content and data and makes the media content and data available to other components by way of the system bus **223**. The processing unit **221** can route the media content and/or data in accordance with the instructions of the operating system **235** and/or other applications executed in the RAM **225**. In addition, the processing

unit 221 may store the media content and data in the RAM 225 for subsequent use. The processing unit 221 may also direct the media content and/or data to the media presentation device 247 via the presentation device adapter 248.

5           The local account manager 236 may be executed by the processing unit 221, in response to a command received from the customer. Such a command might be initiated by use of an input device. Once the local account manager 236 has been executed, the local account manager may access the local account data module 238 to obtain the customer's  
10   current account information and/or current billing information. The local account manager 236 may present the requested information to the customer, for example, in a graphical user interface displayed on the media presentation device 247. The user may modify the customer account information through an input device connected to the MDD 200 and/or the  
15   media presentation device 247. When the customer is finished making modifications to the customer account, the modified customer account data can be stored in the RAM 225 and in non-volatile memory, such as a hard drive (not shown). The local account data module may also be time-stamped to indicate the last time that data was modified.

20           During off-peak hours, the local account manager 236 may autonomously check the local account data module 238 to determine whether the local account data has been modified since the last update to the centralized customer account database associated with the media delivery service provider. If a more recent modification has been made by the  
25   customer, the local account manager can package the local account data

module **238** and transmit that data to the media delivery service provider. The media delivery service provider can then update the customer account database to reflect the modifications.

Advantageously, the local account manager **236** can  
 5 instantaneously implement the customer's account modifications. The local account manager **236** is operative to decode the media delivered from the media delivery service provider in accordance with the customer's local account data module **238**. For example, the media delivery service provider can send a full stream of media to the MDD **200**, including media not  
 10 included in the customer's account. The local account manager **236** acts as a filter to provide the customer with access to those forms of media (i.e., portions of the media stream) that are part of the customer's account and to block the customer's access to media that is not part of the customer's account. Thus, local modification of the local account manager **236** can  
 15 immediately alter this behavior and, thereby, implement the customer's modifications without requiring access to or authorization from the media delivery service provider. The local account data module **238** and the customer's account information maintained in the centralized customer account database can be reconciled during off-peak hours.

20 Figure 3 is a block diagram depicting a media delivery account management system that is an exemplary embodiment of the present invention. The media delivery service provider **302** has a customer account management center **310** associated with it. The customer account management center **310** has a customer account database **320** for  
 25 maintaining account information and billing information for all subscribers

to the Media Delivery Service Provider 302. The customer account management center 310 is operative to communicate with the MDD 300 via the satellite 304, a direct link 308, and/or ADSL modem 306. A broadband connection between the media delivery service provider 302 and the MDD 300 is preferable, because it permits the customer account management center 310 to access the MDD 300 in real-time and can support an "always-on" connection. Because a broadband connection can maintain an always-on status, the local account manager 312 can autonomously send local account data to the customer account management center 310 during off-peak hours of operation, thereby reducing the impact on system resources.

Any changes made by the customer to the local account data can be packaged and transmitted by the local manager 312 to the customer account management center 310. The customer account management center can examine the received local account data and update the customer account database 320 to reflect the customer's desired account modifications. Although the preferable time for transmitting local account data to the customer account management center 310 has been described as being during off-peak hours, it will be appreciated that this transmission can take place at any time. Accordingly, the customer account management center can query the MDD 300 to initiate such a transmission at any time. The customer account management center 310 might be configured to identify low-traffic times and to autonomously initiate such a query. The always-on status of an ADSL connection between the MDD 300 and the media delivery service provider 302 supports such transmissions. Additionally, the high-speed communication provided by an ADSL connection enables realtime

modification of the customer account database 320, should such a modification be desired. Moreover, a broadband connection between the MDD 300 and the media delivery service provider 302 enables the transmission of very large amount of media content. As described above,  
 5 the local account manager 312 can be used to filter the media content on a per-customer basis. Thus, a customer can receive instantaneous delivery of media content, without requiring interaction with the customer account management center 310.

Although the broadband connection depicted in Figure 3 is  
 10 supported by means of an ADSL modem 306, virtually any broadband technology can be used to implement an exemplary embodiment of the present invention. For example, a conventional broadband cable-TV connection between the media delivery service provider 302 and the MDD 300 can be used. Unfortunately, current broadband cable-TV protocols are  
 15 not as secure as an ADSL broadband communication link. Broadband cable-TV signals can be intercepted and deciphered, while the communication link between the ADSL modem 306 and the media delivery service provider 302 can be implemented as a Private Virtual Network that is not shared by other users. Thus, an ADSL broadband connection between  
 20 the MDD 300 and the media delivery service provider 302 is preferred to other available broadband connections.

Figure 4 is a flow chart depicting an exemplary method for locally modifying a media delivery services account. The method for Figure 4 can be implemented to permit the local modification of a customer's  
 25 account parameters that may be subsequently transmitted to a centralized

customer account database. Those skilled in the art will appreciate that various modifications may be made to this embodiment within the scope of the present invention to incorporate various policies of the media delivery service provider. For example, security and privacy steps may be added to the method to ensure the protection of customer account data.

The method begins at step 400 and proceeds to step 402. At step 402, a customer accesses a local account manager. The customer may request access by selecting a function of an MDD (e.g., pressing a button), by sending a command from a media presentation device to the MDD, or by any other means. The method proceeds from step 402 to step 404. At step 404 the stored account data is obtained. In the example of Figure 3, the local account manager may perform this step. The account data may be stored in the RAM in the MDD or in a non-volatile storage unit, such as a hard drive associated with the MDD.

The method proceeds from step 404 to decision block 406. At decision block 406, a determination is made as to whether the account data is recent. A threshold level can be predetermined to define an account data age that is recent. For example, the media delivery service provider may have a policy that disallows customer access to data that is older than one month. The account data can be stored in association with a time stamp to indicate the last modification and/or update to the account data.

If the account data is recent, the method branches from decision block 406 to step 408. At step 408, an account user interface is presented to the customer. This account user interface can be presented, for example, by displaying a graphical user interface on the media presentation device and

providing controls by which the customer can access account data and/or modify account data. The method proceeds from step 408 to decision block 420.

At decision block 420, a determination is made as to whether  
 5 any changes are made to the account data. If no changes are made, the method proceeds to step 428 and ends. If, on the other hand, account changes are made, the method branches from decision block 420 to step 422. At step 422, a local account data file can be modified to reflect the account changes made by the customer. For example, the customer may have  
 10 decided to order the subsequent delivery of a pay-per-view event or may have added a broadcast channel to the customers existing media delivery services package. The method proceeds from step 422 to step 424. At step 424, an account modification flag is set to indicate the need to transmit the locally stored account data to the customer account management center. The  
 15 method proceeds from step 424 to step 418. At step 418, the account data is transmitted to the account management center. Those skilled in the art will appreciate that step 418 may be performed at an off-peak hour to avoid taxing the media delivery service provider's network. The method proceeds from step 418 to step 430. At step 430 an account data time stamp is  
 20 transmitted from the customer account management center to the local account manager. This time stamp can be associated with the account data to indicate that it has been approved and to indicate the time of approval. The method then proceeds to step 428 and ends.

Returning now to step 406, if a determination is made that the  
 25 account data is not recent, the method will branch to step 410. At step 410, a



query is transmitted to the customer account service center to obtain more recent account data. The message proceeds from step 410 to decision block 412. At decision block 412, a determination is made as to whether the customer account service center contains more recent account data related to the customer. If the customer account service center has more recent data, the method branches to step 416. At step 416, the more recent account data is downloaded to the MDD. The method then proceeds to step 408 and the account user interface is presented to the customer.

Returning to decision block 412, if a determination is made that no more recent account data is available in the customer account service center, the method branches from decision block 412 to step 408. At step 408, the account user interface is presented to the customer. The method proceeds from step 408 as described above. Although the present invention has been described in connection with various exemplary embodiments, those of ordinary skill in the art will understand that many modifications can be made thereto within the scope of the claims that follow. Accordingly, it is not intended that the scope of the invention in any way be limited by the above description, but instead be determined entirely by reference to the claims that follow.